Amendments to the Specification

Please replace the paragraphs starting on page 2, line 6 and ending on page 3, line 9 with the following amended paragraphs:

The head size of metal woods, especially drivers, is often referred to in terms of volume. For instance, current drivers may have a head volume of 300 cubic centimeters (cc) or more. Oversized metal woods generally provide a larger sweet spot and a higher moment of inertia, which provides greater forgiveness than a golf club having a conventional head size.

One advantage derived from the use of lighter and stronger metals is the ability to make thinner walls, including the striking face and all other walls of the metal wood club. This allows designers more leeway in the positioning of weights. For instance, to promote forgiveness, designers may place additional weight at the periphery of the metal wood head and rearward from the face. As mentioned above, such weighting generally results in a higher moment of inertia, which results in less twisting due to off-center hits.

There are limitations on how large a golf club head can be manufactured, which is a function of several parameters, including the material, the weight of the club head, and the strength of the club head. Additionally, to avoid increasing weight as the head becomes larger, the thicknesses of the walls, including the striking face, must be made thinner. As a result, as the striking face becomes thinner and thinner, it has a tendency to deflect more and more at impact, and thereby has the potential to impart more energy to the ball. This phenomenon is generally referred to as the "trampoline effect." A properly constructed club with a thin flexible face can therefore impart a higher initial velocity to a golf ball than a club with a comparatively thicker rigid face. Because initial velocity is an important component in determining how far a golf ball travels, this is very important to golfers.

It is appreciated by those of skill in the art that the initial velocity imparted to a golf ball by a thin-faced metal wood varies depending on the location of the point of impact of a golf ball on the striking face. Generally, balls struck in the sweet spot will have a higher ~~rebound~~ initial velocity. Many factors contribute to the location of the sweet spot, including the location of the center of gravity (CG) and the shape and thickness of the striking face.

Please replace the paragraphs starting on page 9, line 2 and ending on page 10, line 20 with the following amended paragraphs:

With reference now to the illustrative drawings, and particularly to FIGS. 1 and 2, there is shown a preferred embodiment of a golf club head of the present invention. The ~~golf~~ club head 11 includes a hollow body 13 having a crown 15 and a sole 17, and further includes a striking plate 19. The striking plate 19 together with the body 13 defines a volume of about 410 cc. The crown 15 and sole 17 preferably are integrally cast of Ti 6Al-4V and include toe and heel ends that together define a front opening 21 to which the striking plate 19 is welded. Preferably, the striking plate 19 is formed of a beta-type titanium alloy comprising by weight substantially about 4% aluminum, 20% vanadium and 1% tin. The height of the front of the club head 11 is about 56 mm, measured vertically from the ground to an uppermost face-crown junction.

The crown 15 has a substantially constant thickness of about 0.7 mm, the sole 17 has a substantially constant thickness of about 0.9 mm, and the striking plate 19 has a thickness of about 1.7 mm at a central, circular portion. The periphery of the striking plate 19 is about 0.5 mm thinner than the central portion of the striking plate 19, or about 1.2 mm, adjacent to the face-crown, face-sole, face-toe and face-heel junctions of the club head 11. Because of the thinness of the walls of the ~~hollow~~ body 13 and striking plate 19, the sole 17 preferably has a ~~thickened portion~~ weight member 23 (shown in phantom in FIG. 1) at a central rear location to add ~~mass of~~ about 20 grams of mass. This added mass brings the total club head weight to a more conventional 190 grams. Testing of this ~~golf~~ club head 11 has shown it to have a coefficient of restitution COR of about 0.90 and, in some cases, and as high as 0.91 (see FIG. 9).

The present invention can be embodied in club heads for both driver-type and fairway wood-type clubs. In the ~~former~~ case of driver-type club heads, ~~heads with~~ high COR values of at least about 0.87 are achievable, while in the ~~latter~~ case of fairway wood-type club heads, high COR values of at least about 0.85 are achievable. These values are about 6-10% higher than previously available. Further, for club heads having lofts less than about 12 degrees, durable heads with COR values of at least about 0.88 are attainable.

In the preferred embodiment described above, the head volume is about 410 cc. In alternative embodiments of the present invention, the club head volume is preferably at least about 100 cc and more preferably is at least 300 cc. The sole 17 preferably has a weight member 23 (FIGS 1 and 10) having a mass between 15 and 25 grams, such that the club head 11 has a conventional total weight of between 180 and 210 grams. More preferably, the weight member 23 is integrally formed on the interior surface of the sole 17 and adds about 20 grams such that the total weight of the club head 11 is about 190 grams. Alternatively, the weight member 23 can be separately formed and attached at any location on the club head 11 using methods known to those skilled in the art.

Referring to FIG. 1, the height ***h*** of the front of the club head 11 in the preferred embodiment is about 45-60 mm, and the striking plate 19 preferably has a height ***hf*** of between 35-50 mm. More preferably, the striking plate 19 has a height of at least 45 mm. Preferably the ratio of the width to the height, or aspect ratio, of the striking plate 19 is between 1.0 and 1.7, and more preferably is about 1.6.

The ~~hollow~~ body 13 preferably is cast from Ti 6Al-4V, although other materials having a comparable strength-to-weight ratio and hardness properties alternatively can be used. Methods other than casting to form the body 13 also can be used.

Please replace the paragraphs starting on **page 11, line 15** and ending on **page 16, line 18** with the following amended paragraphs:

The preferred properties of the striking plate 19 include: (1) an Ultimate Tensile Strength of at least 1400 MPa, (2) a 0.2% Yield Strength of at least 1250 MPa, (3) a Percent Elongation of at least 7%, and (4) a hardness of at least 30 HRC. More preferably, the Ultimate Tensile Strength is at least 1450 MPa, the Yield Strength is at least 1300MPa, the Percent Elongation is at least 7.8%, and the hardness is at least 32 HRC. In addition, the material for the striking plate 19 preferably has a density less than about 5 g/cc.

The striking plate 19 is formed such that the club head 11 has the properties recited above. Preferably, the striking plate 19 is manufactured using cold-forming or cold-working techniques known to those skilled in the art. Processes conducted at ambient temperature, without adding heat, such as hydro press-forming, preferably are used. In the first embodiment of the present invention, ~~the~~ a cold-forming technique preferably is utilized such that additional cold-working time is used to create a reduced or stepped periphery for the striking plate 19.

In a preferred embodiment, the striking plate 19 is formed of a titanium alloy comprising by weight about 4% aluminum, 20% vanadium, and 1% tin. ~~The~~ A sheet of titanium alloy preferably is solution heat treated prior to ~~a~~ cold forming. The cold forming process comprises at least 30% cold working of the striking plate. Although, in the various embodiments of the present invention, cold forming may comprise between 15% to 70% for the striking plate. As shown in the embodiment of FIGS. 1-3, an additional 18% cold working is performed to create a reduced peripheral thickness of the striking plate 19 that is about 0.5 mm less than a thickness of about 1.7 mm at a center of the striking plate 19.

After the ~~final~~ striking plate 19 has been welded to the front opening of the ~~cast~~ body 13, the club head 11 preferably is aged to obtain a higher strength. This contributes to the club head's high COR values.

In an alternative embodiment shown in FIG. 4, a club head body 13' is the same as described above, but the striking plate 19 ' is formed ~~of~~ with a substantially constant thickness from a titanium alloy comprising by weight about 4.5% aluminum, 2% molybdenum and 3% vanadium and it has a substantially constant thickness. In both embodiments, the striking plate 19' is welded to the ~~cast~~ body's front opening 21. Support tabs 25, (shown in phantom in FIG. 1) or an annular ledge (not shown) can be used to position the striking plate during welding.

FIG. 9 shows measured COR values for the embodiments of FIGS. 1-3 ("Head A") and FIG. 4 ("Head B"). It can be seen that, in general, the COR values vary inversely with the thickness of the striking plate 19, measured at about the striking plate's geometric center. After a maximum COR value that occurs ~~at about~~ with a 1.6 mm ~~face~~ striking plate thickness,

the COR values ~~decline~~ decrease as the striking plate thickness decreases as a result of plastic deformation that occurs due to the over-thinned face structure. Also, the ~~face~~ striking plate 19 tends to crack upon impact at thickness lower than about 1.4-1.5 mm. Durability requirements, therefore, lead to production of club heads with face thicknesses substantially higher. In particular, a ~~face~~ striking plate thickness of about 2.0-2.2 mm is desirable to achieve a high COR of about 0.88 while having sufficient durability to withstand repeated impacts with a golf ball during normal play.

Other embodiments of a striking plate in accordance with the present invention are shown in FIGS. 5 and 6. FIG. 5 shows a striking plate 19" having a thickness that varies from a thickest point at about its geometric center to lesser thicknesses toward the top and bottom and toward the toe and heel (not shown). FIG. 6 shows a striking plate 19''' that extends or wraps toward the crown 15''' and sole 17''' of the ~~club head~~ body 13''' such that at least the top and bottom weld joints lie on substantially horizontal planes formed by the crown 15''' and sole 17'''. FIGS. 7, 8 and 8A show a striking plate 27 that forms substantially the entire front of the club head 11 and that wraps such that the weld joints are rearward of the forward most surface of the club head 11 that contacts a golf ball.

The embodiments of FIGS. 6-8A include rearwardly wrapped upper and lower portions of the striking plate 19 that form obtuse and acute angles, respectfully, with the forward portion of the striking plate 19. The striking plate 19 of FIGS. 7-8A also includes rearwardly wrapped toe and heel portions that join smoothly with the corresponding portions of the ~~club head~~ body 13. These wrapped portions of the striking plate 19 have thicknesses matching or transitioning to that of the crown 15 and sole 17, and heel and toe, of the ~~club head~~ body 13, as required.

The wrapped striking plate 19 may be cold formed or hot forged to obtain the shapes and desired rearward lengths and thicknesses of the upper and lower portions, and heel and toe portions if present. The resulting location of the weld joints for these embodiments, i.e., rearward from the front impact area of the club head 11, assists in increasing durability of the ~~golf~~ club head 11 and improving COR quality control during manufacture.

Although the foregoing preferred embodiments include a ~~hollow~~ body 13 with a front opening for attachment of a striking plate 19, alternative methods known to those skilled in the art are available for forming a ~~golf~~ club head 11 in accordance with the present invention without a separately formed striking plate 19. These methods include, but are not limited to, injection molding and bladder forming techniques, wherein a metallic component incorporating a titanium alloy may be included. Any of the methods described herein may be employed for the ~~golf~~ club head thicknesses, material density and mechanical properties of the present invention, as described herein.

In accordance with the present invention, a majority of the crown 15 of the club head 11 is less than about 0.8 mm thick, and a majority of the sole 17 of the club head 11 is less than about 1.0 mm thick. Preferably, at least transition regions Rc, Rs extending about 20 mm from the junction of the striking plate 19 with the crown 15 and sole 17 ~~portions~~ of the club head 11 are less than about 0.8 mm and 1.0 mm thick, respectively. This transition region is shown in one preferred embodiment in FIG. 10.

~~A preferred manufacturing method of the present invention includes the steps of:~~

~~(a) casting a body 13 of a titanium alloy, the body 13 having a crown 15, a skirt and a sole 17 defining a front opening, the crown 15 having a substantially constant thickness of less than 0.8 mm, the sole 17 having a substantially constant thickness of less than 1.0 mm;~~

~~(b) providing a weight member 23 of about 20 grams onto the sole 17 of the body 13;~~

~~(c) cold forming a striking plate 19 having a hardness of at least about 30 HRC and a percent elongation of about 7%, the striking plate 19 having a thickness of less than 2.2 mm and formed from a material having a density less than about 5 g/cc; and~~

~~(d) welding the striking plate 19 to the front opening of the body 13.~~

In a preferred manufacturing method of the present invention, a titanium body 13 is formed using a casting process. The body 13 has a crown 15 having a substantially constant thickness of less than 0.8 mm, a skirt, and a sole 17 having a substantially constant thickness of less than 1.0 mm. The body 13 defines a front opening 21. A weight member 23 of about 20 grams is coupled to the sole 17 of the body 13. A striking plate 19 is formed using a cold

forming process, such that the striking plate 19 has a thickness of less than 2.2 mm. The striking plate 19 is formed from a material having a hardness of at least about 30 HRC, a percent elongation of about 7%, and a density less than about 5 g/cc. The striking plate 19 is attached to the front opening of the body 13 using a welding process.